CLAIMS

1. A method for fabricating a crystallized semiconductor thin film, comprising the step of irradiating a main energy beam and a sub energy beam, whose energy per unit area is smaller than that of the main energy beam and lower than an energy threshold at which a semiconductor thin film fuses, to the semiconductor thin film formed on a substrate, so as to fuse the semiconductor thin film over a whole area in a thickness direction and crystallize the semiconductor thin film, wherein

the sub energy beam is irradiated so as to adjoin the main energy beam.

2. The method as set forth in claim 1, wherein there is performed pulse irradiation of the main energy beam and/or the sub energy beam to the semiconductor thin film.

3. The method as set forth in claim 1, wherein irradiation of the main energy beam is started at a time when energy per unit area with which the sub energy beam is irradiated to a surface of the semiconductor thin film reaches a maximum.

4. The method as set forth in claim 1, wherein the main energy beam and the sub energy beam are irradiated so as to

be different from each other in terms of a wavelength.

5. The method as set forth in claim 4, wherein a laser light whose wavelength is 532nm is irradiated to the semiconductor thin film as the main energy beam and a laser light whose wavelength is 308nm is irradiated to the semiconductor thin film as the sub energy beam.

6. The method as set forth in claim 1, wherein:

the substrate has a thermal conductive insulator film formed between the substrate and the semiconductor thin film, and

the thermal conductive insulator film is made of at least one material selected from aluminum nitride, silicon nitride, aluminum oxide, magnesium oxide, and cerium oxide.

7. A fabrication device for fabricating a crystallized semiconductor thin film, comprising energy beam irradiating means for performing pulse irradiation so that a main energy beam and a sub energy beam, whose energy per unit area is smaller than that of the main energy beam and lower than an energy threshold at which a semiconductor thin film fuses, are irradiated to a semiconductor thin film formed on a substrate, wherein

the energy beam irradiating means irradiates the sub

energy beam so that the sub energy beam adjoins the main energy beam.

8. The fabrication device as set forth in claim 7, wherein:

the energy beam irradiating means includes (i) a mask for forming patterns of the main energy beam and the sub energy beam irradiated to the semiconductor thin film and (ii) an imaging lens for imaging said main energy beam and sub energy beam, which have penetrated said mask, on the semiconductor thin film, and

the mask forms a pattern of the main energy beam and a pattern of the sub energy beam adjoining the pattern of the main energy beam.

9. The fabrication device as set forth in claim 7, wherein the energy beam irradiating means performs pulse irradiation of the main energy beam and/or the sub energy beam.

10. The fabrication device as set forth in claim 7, wherein the energy beam irradiating means irradiates a laser light.

11. A fabrication device for fabricating a crystallized semiconductor thin film, comprising:

a first beam irradiating section for irradiating a main energy beam;

a first mask for forming a pattern of the main energy beam irradiated by the first beam irradiating section;

a second beam irradiating section for irradiating a sub energy beam whose energy per unit area is smaller than that of the main energy beam and lower than an energy threshold at which a crystallized semiconductor thin film fuses;

a second mask for forming a pattern of the sub energy beam irradiated by the second beam irradiating section; and

an imaging lens for imaging patterns, respectively formed by the first mask and the second mask, on a semiconductor thin film, wherein

the first mask and the second mask form patterns by which the sub energy beam is irradiated to the semiconductor thin film so as to adjoin the main energy beam.

12. The fabrication device as set forth in claim 11, comprising:

controlling means for controlling a timing at which the main energy beam is irradiated by the first beam irradiating section and a timing at which the sub energy beam is irradiated by the second beam irradiating section; and

adjusting means for respectively adjusting energy per unit area with which the main energy beam is irradiated by

the first beam irradiating section and energy per unit area with which the sub energy beam is irradiated by the second beam irradiating section.

13. The fabrication device as set forth in claim 11, wherein the first beam irradiating section and the second beam irradiating section irradiate energy beams different from each other in terms of a wavelength.

14. The fabrication device as set forth in claim 11, wherein the first beam irradiating section and/or the second beam irradiating section perform pulse irradiation of energy beams.